In the Claims:

Please amend claims 1, 4, and 9-10 by substitution as follows:

Sub C1

1. (Once amended) An m × n sensor array, comprising:

m distribution fiber lines;

n return fiber lines; and

z sensor groups, each of said z sensor groups comprising:

y sensors; and

input couplers and output couplers, said input couplers and said output couplers being connected to respective ones of said sensors, each of said input couplers within any one of said z sensor groups being connected to a different one of said m distribution fiber lines;

wherein each of said return fiber lines is connected to all output couplers within a respective one of said z sensor groups;

wherein coupling ratios of said input couplers in said z sensor groups and coupling ratios of said output couplers in said sensor array are chosen to reduce differences in the returned optical signal power levels, wherein the coupling ratios of said output couplers connected to a respective return fiber line are different from each other; and

Sub cl end

Contd B2

wherein said output couplers comprise a first output coupler and a second output coupler, wherein a first number of said output couplers are located between said first output coupler and a signal destination on one of said n return fiber lines, wherein the first number is greater than or equal to zero, wherein the coupling ratio of said first output coupler is based on the first number, wherein a second number of said output couplers are located between said second output coupler and the signal destination on the one of said n return fiber lines, wherein the coupling ratio of said second output coupler is based on the second number, wherein the second number is greater than the first number, wherein the coupling ratio of said second output coupler is larger than the coupling ratio of said first output coupler.

Sub C2 B3

4. (Twice amended) A sensor array, comprising:

distribution fiber lines;

return fiber lines; and

sensor groups, each of said sensor groups comprising:

sensors; and

input couplers and output couplers, said input couplers and said output couplers being connected to respective ones of said sensors, each of said input couplers within any one of said sensor groups being connected to a different one of said distribution fiber lines;

wherein each of said return fiber lines is connected to all output couplers within respective ones of said sensor groups; and

wherein coupling ratios of said input couplers and said output couplers are chosen to reduce differences in the returned optical signal power levels, said input couplers in a first sensor group having a first input coupling ratio and said input couplers in a second sensor group having a second input coupling ratio different from said first input coupling ratio;

wherein one or more signal sources, that comprise a first signal source, are coupled with respective ones of said m distribution lines, that comprise a first distribution line;

Sub C2 end

wherein said input couplers comprise a first input coupler and a second input coupler, wherein a first number of said input couplers are located on the first distribution line between the first signal source and said first input coupler, wherein the first number is greater than or equal to zero, wherein the coupling ratio of said first input coupler is based on the first number, wherein a second number of said input couplers are located between the first signal source and said second input coupler, wherein the coupling ratio of said second input coupler is based on the second number, wherein the second number is greater than the first number, wherein the coupling ratio of said second input coupler is larger than the coupling ratio of said first input coupler;

Cont'd B3

wherein each output coupler is connected to a respective return fiber line from a sensor group having a coupling ratio that differs from the coupling ratio of the other output couplers connected to the respective return fiber line, wherein said output couplers comprise a first output coupler and a second output coupler, wherein a first number of said output couplers are located between said first output coupler and a signal destination on one of said return fiber lines, wherein the first number is greater than or equal to zero, wherein the coupling ratio of said first output coupler is based on the first number, wherein a second number of said output couplers are located between said second output coupler and the signal destination on the one of said return fiber lines, wherein the coupling ratio of said second output coupler is based on the second number, wherein the second number is greater than the first number, wherein the coupling ratio of said second output coupler is larger than the coupling ratio of said first output coupler, said input coupling ratios and said output coupling ratios selected in accordance with respective locations of said input couplers on said distribution fiber lines and respective locations of said output couplers on said return fiber lines.

9. (Once amended) The m × n sensor array as defined in Claim 1, wherein the coupling ratio of any one of said output couplers is based on a number of said output couplers located between the any one of said output couplers and a signal destination on one of the said n return fiber lines that corresponds to the any one of said output couplers.

10. (Once amended) The m × n sensor array as defined in Claim 1, wherein the coupling ratio of any one of said input couplers is based on a number of said input couplers located between the any one of said input couplers and a signal source on one of the said m distribution fiber lines that corresponds to the any one of said input couplers.

Please add claims 13-24 as follows:

13. (New) The array of claim 1, wherein the coupling ratios of said input couplers in said z sensor groups and the coupling ratios of said output couplers in said sensor array serve to cause all the returned optical signal power levels to be within a preselected variance range.

14. (New) The array of claim 1, wherein y is greater than or equal to m.

15. (New) The array of claim 1, wherein a multiplicative product of m and n is equal to a multiplicative product of z and y.

16. (New) The array of claim 1, wherein one or more distribution fiber lines of the m distribution fiber lines are each coupled with two or more corresponding non-adjacent instances of the sensors.

17. (New) The array of claim 2, wherein z is 16 and y is 6.

18. (New) The array of claim 2, wherein z is 8 and y is 12.

19. (New) The array of claim 9, wherein the coupling ratio of the any one of said output couplers varies directly with the number of said output couplers located between the any one of said output couplers and the signal destination that corresponds to the any one of said output couplers.

20. (New) The array of claim 4, wherein the coupling ratios of said input couplers and the coupling ratios of said output couplers in said sensor array serve to cause all the returned optical signal power levels to be within a pre-selected variance range.

Sub C5

Cont'd C5

21. (New) An m × n sensor array, comprising:

m distribution fiber lines;

n return fiber lines; and

z sensor groups, each of said z sensor groups comprising:

y sensors; and

input couplers and output couplers, said input couplers and said output couplers being connected to respective ones of said sensors, each of said input couplers within any one of said z sensor groups being connected to a different one of said m distribution fiber lines;

wherein each of said return fiber lines is connected to all output couplers within a respective one of said z sensor groups; and

wherein coupling ratios of said input couplers in said z sensor groups and coupling ratios of said output couplers in said sensor array are chosen to reduce differences in the returned optical signal power levels, wherein said input couplers comprise a first input coupler and a second input coupler, wherein a first number of said input couplers are located between a signal source and said first input coupler on one of said m distribution lines, wherein the first number is greater than or equal to zero, wherein a second number of said input couplers are located between the signal source and said second input coupler on the distribution line, wherein the second number is greater than the first number, wherein the input coupling ratio of said second input coupler is higher than the input coupling ratio of said first input coupler.

Sub cs Cmt

Contd 16

22. (New) An m × n sensor array, comprising:

m distribution fiber lines;

n return fiber lines; and

z sensor groups, each of said z sensor groups comprising:

y sensors; and

input couplers and output couplers, said input couplers and said output couplers being connected to respective ones of said sensors, each of said input couplers within any one of said z sensor groups being connected to a different one of said m distribution fiber lines;

wherein the n return fiber lines comprise one or more sets of said n return fiber lines, wherein a first one of each set of said n return fiber lines is connected to a first subset of said output couplers within a respective one of said z sensor groups, wherein a second one of each set of said n return fiber lines is connected to a second subset of said output couplers within the respective one of said z sensor groups;

wherein coupling ratios of said input couplers in said z sensor groups and coupling ratios of said output couplers in said sensor array are chosen to reduce differences in the returned optical signal power levels, wherein the coupling ratios of said output couplers connected to a respective return fiber line are different from each other; and

wherein said output couplers comprise a first output coupler and a second output coupler, wherein a first number of said output couplers are located between said first output coupler and a signal destination on one of said n return fiber lines, wherein the first number is greater than or equal to zero, wherein the coupling ratio of said first output coupler is based on the first number, wherein a second number of said output couplers are located between said second output coupler and the signal destination on the one of said n return fiber lines, wherein the coupling ratio of said second output coupler is based on the second number, wherein the second number is greater than the first number, wherein the coupling ratio of said second output coupler is larger than the coupling ratio of said first output coupler.

23. (New) The array of claim 22, wherein the one or more sets of said n return fiber lines comprise one or more pairs of said n return fiber lines, wherein a first one of each pair of said n return fiber lines is connected to the first subset of said output couplers within the respective one of said z sensor groups, wherein a second one of each pair of said n return fiber lines is connected to the second subset of said output couplers within the respective one of said z sensor groups.

24. (New) The array of claim 22, wherein one or more return fiber lines of said n return fiber lines are each coupled with two or more corresponding non-adjacent instances of the y sensors.